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# ≡ SOIL CONSERVATION ≡

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

# SOIL CONSERVATION

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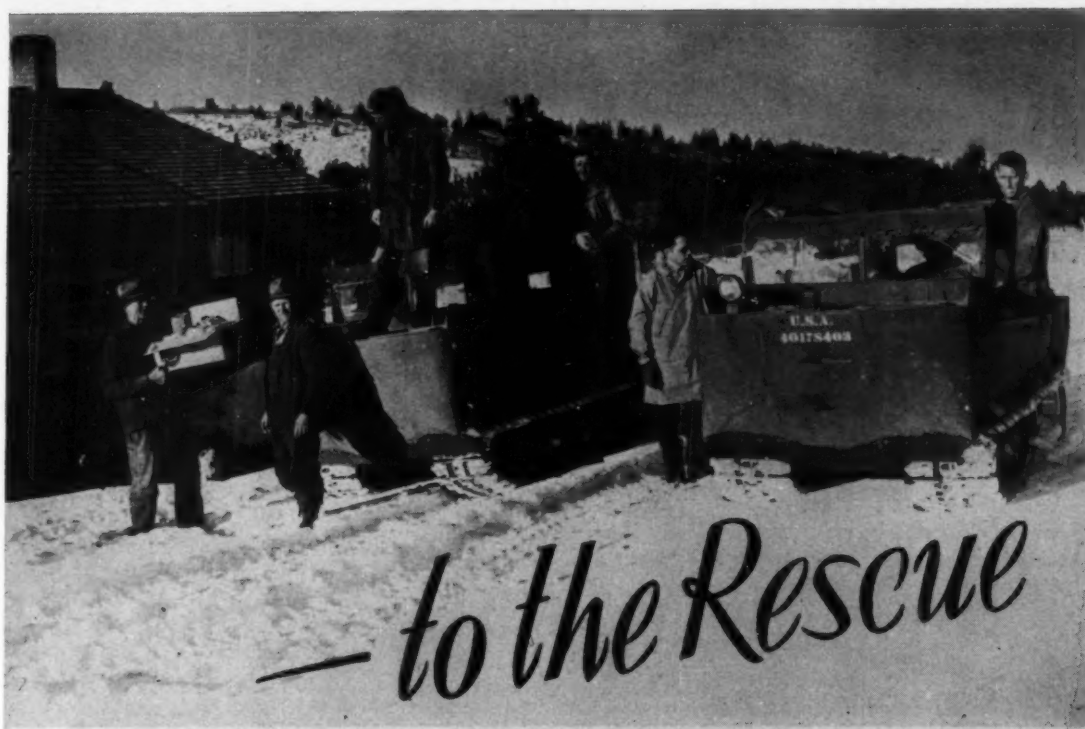
WELLINGTON BRINK, EDITOR

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*Front Cover: This Hereford bull, strong, healthy and well-conditioned, is the beneficiary of the nutritious, plentiful range which results from careful conservation management.*

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Snow weasels, loaned by the Pueblo Ordnance Depot to the Soil Conservation Service, carried food and medical supplies to marooned families and took the sick to town for treatment. (Photo by Morris-Walsenburg.)

BY VIRGIL S. BECK

**S**NOW started falling over eastern Colorado early on November 2, 1946. By midafternoon a full-fledged blizzard had developed, which continued unabated for 40 hours. With brief lulls, the snowstorm raged more than a week over the area from Denver south to Trinidad and east to the Kansas line.

It was the worst snowstorm since December 1913, when scores of lives were lost and many thousands of cattle and sheep perished. All roads were blocked. Farmers and ranchers who normally figured on getting into towns for food and supplies at frequent intervals were isolated.

Ranchers in this area depend on year-around grazing, with a small amount of feeding during stormy periods. The heavy snow prevented livestock from grazing. High winds drifted arroyos

full of snow, and thousands of livestock were trapped and cut off from feed.

Urgent pleas for food, medical supplies, and feed for livestock poured into almost every city and town in the snowbound area. County equipment was pushed to the limit trying to keep the main road open.

Work in soil conservation districts throughout the area had acquainted ranchers and farmers with the fact that most of these organizations owned tractors and other equipment that could be helpful in rescue work. District officials and Soil Conservation Service technicians, therefore, in many instances, took the lead in planning rescue work.

At a meeting of farmers and townspeople in the district work unit office at Fowler November 5, 1946, it was agreed that there was not enough district equipment in the storm-stricken area to provide relief in time, so the group decided to ask the Pueblo Ordnance Depot for more equipment.

D. C. Bascom, work unit conservationist at Fowler, called Col. Joseph Horridge, commanding

NOTE.—The author is head of the current information section, Soil Conservation Service, Albuquerque, N. Mex.



Ordinary trucks couldn't make it through the pile-up of snow. These three stranded vehicles are being towed by a district tractor.

officer of the depot, and explained the critical need for equipment. The colonel cited regulations prohibiting the lending of Army equipment to any other than a Federal agency, so Soil Conservation Service representatives readily agreed to accept full responsibility. Soil conservation district officials guaranteed the expenses for operations. Colonel Horridge immediately obtained clearance from Washington.

Within a few hours 70 pieces of ordnance equipment were dispatched on rescue missions which were to save scores of human lives and many thousand head of livestock during the next 3 weeks. Giant six-by-six trucks, proved effective in going through 5-foot snowdrifts and often were operated in pairs, with one pulling and the other pushing. They were driven by civilian volunteers and used mainly for getting feed to livestock. Snow weasels, handled by Army personnel, carried food, fuel, and medical supplies to isolated families, and took sick persons to hospitals.

A few days later Field Bohart, president of the Central Colorado Soil Conservation District, conferred with J. S. Young, district conservationist, and it was decided to make an aerial survey of about 2,600 square miles of the snowbound area east of Colorado Springs. Bohart, an experienced flier and a member of the Sky Ranchers Flying Club, contacted this organization and others, and formulated plans for the reconnaissance flights.

Young got in touch with all radio stations and arranged for the broadcasting of instructions to snowbound families. By making crosses on the snow with soot, boards or fertilizer, they could indicate their need for help—one cross for food, and two for medical attention.

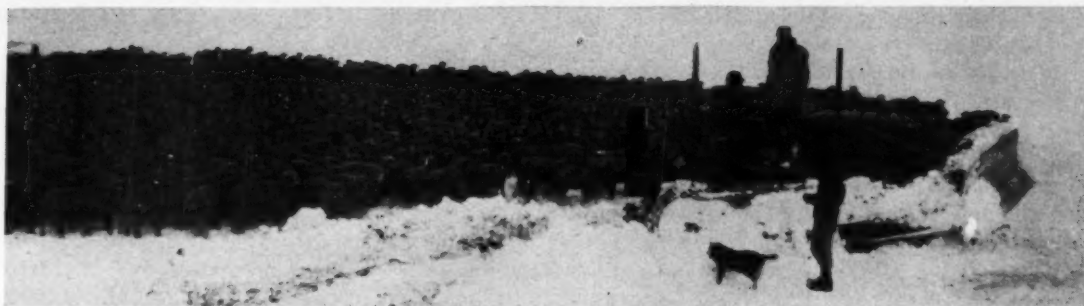
Thus, probably the greatest cooperative rescue mission in the history of Colorado got under way.



The worst blizzard since 1913 walled in farmers and ranchers of eastern Colorado, made it necessary for them to dig out from under 3 to 5 feet of snow.

Many district offices became rescue headquarters and were kept open day and night to receive calls for aid and to direct the rescue work. While district and Service people took the lead, the success of the mission resulted from the unified efforts of numerous groups. Personnel of the





This is one of the many flocks of sheep saved from starvation by rescue workers. These 1,500 animals were driven to feed over the trail opened by the machine in the foreground.

Pueblo Ordnance Depot, in addition to providing vehicles, worked untiringly throughout the crisis, as did personnel of Peterson Air Field at Colorado Springs. The Red Cross, county commissioners, county agents, individual farmers, ranchers, and townspeople contributed their full share. Radio stations broadcast messages to the marooned.

In addition to planning reconnaissance flights, Young maintained emergency relief headquarters in his Colorado Springs offices for all of eastern Colorado for 5 days before the Red Cross began functioning. Service employees Leland C. Higginson, M. R. Murphy, W. S. Caton and others made numerous flights with Fifteenth Air Force crews, dropping foodstuffs to snowbound families. James Dewey and Ed Bryant traveled more than 500 miles in weasels, distributing food to scores of families. Young accords much credit for the success of rescue work to Field Bohart, who had the foresight to purchase a weasel more than a year previously for use in just such emergencies, and who planned the relief work so efficiently.

In addition to arranging for the use of Army equipment in the rescue work, D. C. Bascom, work



All roads were impassable; many had drifts worse than this.

unit conservationist at Fowler, kept his office open continuously for 14 days. There was an average of 16 calls per night for aid, in addition to a heavy daytime load. The office was used as a clearing point for routing vehicles and assigning volunteer drivers and guides, many of whom worked as long as 48 hours without sleep. Bascom reports that 43 trucks and weapons-carriers were used in assisting 112 ranchers in the area. No record was kept as to how many people received food and fuel transported by weasels.

Worth Karn, work unit conservationist at Timpas, faced a serious problem on the 600,000-acre land utilization project where few stockmen reside and livestock is widely scattered. Deep canyons were drifted full of snow, making travel hazardous. Karn received equipment and worked almost day and night for 2 weeks, breaking trails, hauling feed, and driving livestock to accessible



Two weeks without feed was too much for this bull. He became too weak to walk and had to be shot.

spots. His former experience as a cowboy and his knowledge of the terrain resulted in the saving of 12,000 cattle and 6,300 sheep.

The *Bent County Democrat* says that the Bent Soil Conservation District equipment was used in opening roads and trails which resulted in the saving of livestock worth at least half a million dollars, and permitted isolated farmers and ranchers to get food, fuel, and medical supplies. Walter Hopkins, work unit conservationist at Las Animas, was personally in charge of the rescue mission. J. B. McCaskell, district employee, operated the district tractor with an angle dozer, this being the only equipment in the area capable of opening roads. During the rescue mission, the equipment was operated from 11 to 16 hours a day.

More than 200 miles of roads and trails were opened, and between 4,000 and 5,000 cattle, and 4,000 sheep were saved. The rescue party spent nights in schoolhouses, and often lived on Army K rations. Fuel and food were dropped to them by plane. The tractor was without anti-freeze, so had to be drained each night and refilled with melted snow in the mornings.

An estimated 1,200 head of cattle and 3,000 sheep valued at more than \$100,000 were rescued through the use of the Prowers Soil Conservation District tractor and another working in the district. The equipment was used full blast for more than a week in breaking trails to marooned livestock, opening roads, hauling feed, and getting food to snowbound families. While about 6 percent of the livestock perished, district efforts greatly reduced losses.

In Huerfano County, M. H. Mickey, work unit conservationist for the Huerfano Soil Conservation District, and O. L. Stancato, another Service employee, were among the leaders in organizing rescue work. They worked almost continually for 10 days, rescuing an expectant mother and 3 people who were critically ill. Food was taken to 20 families, feed to 90 ranches, and 12,000 head of livestock were saved from starvation.

The Purgatoire Soil Conservation District supervisors made their tractor available and it was used for 4 weeks in opening 130 miles of roads. Nick Iuppa and Sam Trujillo, district tractor operators, gave full time to rescue work during the entire period. Army trucks were operated 13 hours a day and delivered 130 tons of feed to livestock. The mud was so deep during most of the

period that the six-by-sixes averaged only a mile to a gallon of gas.

Harry D. Petheram, district conservationist at Pueblo, estimated that rescue efforts saved at least 15,000 cattle in Pueblo, Otero, and Crowley Counties. Harry Hauser, work unit conservationist at Pueblo, planned the rescue work, while Tony Martinelli and Gerald Carr, engineering aides, drove trucks during the period.

The Deer Trail Soil Conservation District tractor was used in opening 40 miles of emergency roads. When a county tractor went through a bridge, Jack F. Davenport, conservation aide, drove the district tractor all night, and, after a few hours sleep, worked all day helping to extricate the county tractor. He then spent 11 hours opening roads to starving livestock. District and Service personnel got 3,300 cattle and 1,000 sheep to feed, most of which would have died within a short while. Opening of roads enabled 28 families to reach towns for supplies.

When word came that a farmer had been injured severely when he fell from the roof of his home while removing snow, Orville W. Huscher, conservation aide with the Kiowa Soil Conservation District, and a county employee took a tractor equipped with an angle dozer and worked from 8 p. m. until 2 a. m., opening a road to the injured man's house. After the man was cared for, Huscher and his companion worked 16 hours opening 50 miles of road so farmers could get to town for supplies.

Two tractors owned by the Agate Soil Conservation District were used in opening more than 100 miles of roads, rescuing from almost certain death 4,000 sheep and 200 cattle, and getting 1,500 other sheep and 400 cattle to food and shelter. Food and supplies were delivered to 12 families.

At Simla, Service personnel worked throughout the emergency hauling feed to isolated ranches.

These are only the highlights of rescue activities that centered around soil conservation districts. They show that districts, in addition to carrying on their soil and water conservation activities, also can be of service to their communities in many other ways. The value of the rescue work centering around the districts is evidenced by the fact that, despite the severity of the November blizzard, livestock losses were less than one percent.

As one district supervisor commented, "Soil conservation is our job, but human conservation comes first. Without people, the soil doesn't matter."

# Legal Aspects of DISTRICT ADMINISTRATION

By GEORGE T. MICKELSON  
Governor of South Dakota

**A**BOUT a year ago, the supervisors of a South Dakota soil conservation district had difficulty collecting for some work done with district equipment. The case came to us, since under the law of this State the district may call upon the attorney general for such legal services as it may require. It was settled easily, but it could have had a less happy outcome. Some fundamental contractual and agency principles had been overlooked.

This case put a finger on a vital part of soil conservation district administration, namely, a need for supervisors to understand the legal aspects of their jobs. What happened here led to a scrutiny of the minutes of the meetings of several soil conservation districts, a review of some of their activities, and a review of opinions issued by my office at the request of districts. Evidently, some instruction was called for.

This instruction was given in South Dakota. As a result, minutes of the boards of supervisors' meetings have been straightened out. Functions are delegated properly. Contracts for work are in order. The instruction was given at a series of meetings of supervisors at various places within the State. I attended each meeting, described the functions and duties of supervisors and explained how other laws affect them. I also discussed other legal problems with which they were concerned. The question period indicated that these men were anxious to have this information.

Once the supervisors have been put on the right track, it is a simple matter for them to keep the district's legal affairs in order. It requires only the use of common sense; rules to be remembered are few. But if a district gets started wrong, its affairs can get into a muddle. The first thing supervisors should understand clearly is that they



Governor Mickelson.

**NOTE.**—George T. Mickelson is a native of South Dakota, the son of a farmer, and an experienced farmer himself. He still owns farmland and is engaged in the livestock industry in his home county—Walworth. He received his law degree from the University of South Dakota School of Law in 1927 and immediately returned to Selby, his home town, to practice law. He became attorney general, January 1, 1943, after three terms in the state legislature.

Governor Mickelson, as attorney general, showed a great deal of interest in helping soil conservation districts function properly. His State-wide trip early in 1946 to explain the legal aspects of soil conservation district administration to all supervisors is the first instance in which an attorney general has gone to the field in an effort to help them meet their responsibilities most effectively.

are governed by State laws. These differ from State to State. Next, they should understand their status as government officials and what it means.

South Dakota soil conservation districts are declared by law to be governmental subdivisions of the State, and a public body, corporate and politic. The board of supervisors of soil conservation districts may be compared with a board of county commissioners, and a school board. They are the governing body of the district. They cannot tax, levy assessments or issue bonds, but in doing the things they are authorized to do they have similar responsibilities and enjoy similar immunities to those of county commissioners and school boards.

What does this mean? Probably the first thing to be pointed out—because it was the one in which the largest number of boards were found at fault—is that delegation of functions must be by action of the board and recorded in detail in the board's minutes. Next, the supervisors must act as a board and not as five individuals. Acting on his own initiative, a supervisor has no more right to delegate a function or make a commitment for the district than anyone else. It takes the board acting as such to do those things and assign responsibilities as it sees fit.

Thus, for instance, the minutes must show what authority the board has granted to the treasurer to handle the district's money and make collections in payment for work done and materials sold by the district. Or if the supervisors want some one person to handle its contracts, they must specify in the minutes of the board the scope of the authority that is delegated. Functions not specifically delegated rest solely in the board.

On the other hand, the South Dakota district supervisors are protected from liability in much the same manner as county commissioners. Thus, another set of laws is brought into play by the provision in the soil conservation districts law that a district may sue or be sued.

This is a broader subject and somewhat more technical than what has just been discussed. It need be touched on only briefly here to illustrate the principle. For instance, the district would not be liable for what is known as an "attractive nuisance." An illustration of this would be a piece of district equipment left where it might attract young children to play on it. A private operator if guilty of negligence in that regard

would be liable if one of the youngsters was hurt; not so with the county or soil conservation district. Even so, it is wise to insist that employees be careful.

Another instance would be where the board mistakenly made a contract which it may not be authorized by law to make. The rule regarding county commissioners is that it is the responsibility of the other party to know whether the commissioners can legally enter into such a contract. The same is true of boards of supervisors.

Under the terms of the South Dakota Workmen's Compensation Law the supervisors are automatically deemed to have accepted the provisions of the act. It is incumbent to provide compensation insurance.

The issue was raised whether or not municipalities can tax property owned by a South Dakota district. The answer is no, because the districts are subdivisions of State government. It was also held that property bought by a district is exempt from the State sales tax.

There is little excuse for district supervisors having difficulty over contracts. Yet, the incident mentioned in the first paragraph, which arose over work done with district equipment, illustrated an informality that can backfire. The work was in line with the intentions set forth by the cooperator in the farmer-district agreement that outlined the proposed farm conservation plan. It was a type of work the supervisors could legally contract for. Trouble was, no definite contract was made either in writing or verbally. There was no meeting of minds.

Arrangements had been made with the landowner, which was correct procedure. But it was clear that there was confusion as to what was to be done, the amount of work, and the cost. When the equipment arrived at the farm, instructions were taken from the tenant who was not the landlord's agent. And in addition, the differing ideas the landlord and the person acting for the supervisors had in mind about the job led the landlord to claim nonperformance.

The case brought out these things that district supervisors should be sure about. They should be sure that there is a mutual understanding on the part of all parties as to what is to be done, and what it will cost. This need not be a total sum for a job; it may be a specified rate per hour, for instance. And the supervisors should be sure that the person with whom they are dealing has



the right to act. If it is a tenant, be certain that he has authority to represent the landlord.

These contracts need not be in writing, if they are to be performed within a year from their making, although that is desirable. The limited variety of equipment work the district will do for the farmers should make the use of form contracts easy. And it would help to assure that there is full accord between farmers and supervisors.

The same general principles apply to all contracts a district makes, such as for the purchase of supplies and materials, equipment or property, and so on. All contracts should be executed by the districts and the other contracting party.

District supervisors also have some moral responsibility in matters to which they are not parties, namely, to call to a cooperator's attention to steps which must be taken before establishing some types of conservation practices, and to instruct him to get legal advice when it seems necessary. This does not mean that the supervisors should become lawyers. But they should be well enough informed, or see to it that those representing them are informed, to tell a farmer when he should get an easement or a water right and when legal advice should be sought.

Most farmers will be acquainted with many of these things. But it is better in order to protect the reputation of the district and the supervisors to be over-cautious rather than to assume too much. A farmer may know he needs an easement, but it may have slipped his mind. He will appreciate being reminded of it. To other farmers, the information may be news. Check lists of probable legal requirements in connection with different conservation practices would be a help. It may be possible to prepare them.

Let me give you an illustration of what can happen. About a decade ago, a large dam was built in one part of this State. No easement was secured for the spillway and no objection was raised by the landowner affected. The property has changed hands and the new owner is demanding a high price for the land occupied by the spillway and the land over which the water flows back to the natural drainage. There is no chance to get title through adverse possession, that is, by holding the property for a time specified by law. It may cost the owner of the dam quite a sum. Yet, there is no doubt that the easement would have been given gladly and without cost before the dam was built.

Had this been a district cooperator, it seems to me, the supervisors would be under an obligation to remind him to get an easement before he started the dam.

Of course, there will be many questions that the supervisors cannot answer. They should not hesitate to seek advice. During the last year, district supervisors have come to us with problems concerning drainage and the straightening of stream channels. These are complex legal problems and the supervisors were wise in getting information. Now they are forearmed; they can help their farmers avoid complications.

Water rights are another field in which the supervisors should advise cooperators to be sure of their ground. Riparian rights—that is, the rights of a landowner to the flow of a stream beside or through his place, undiminished in quantity and quality—are centuries old. Appropriation of water for irrigation is a more recent development, principally in the western States.

In order to help their cooperators know whether water rights will be involved in a conservation practice, the supervisors should know a few basic definitions. There may be only two or three. One is the definition of a stream in their States; it isn't always one in which water flows continuously. Another is the definition of diffuse water. Then, if a water right is involved, the farmer can be directed to the proper authorities.

The scope of the State soil conservation districts law is bound to broaden the fields in which various district boards will seek legal advice. This has been evident in South Dakota, even though only a few opinions have been issued by our staff. At first, the questions dealt solely with the soil conservation districts law. Then questions which centered on various parts of the soil conservation program began to come up from various districts.

Actually, the supervisors can do just about anything needed to help the farmers and ranchers conserve their soil and water, provided they stay within the framework of the laws that affect them. They are important people. More important, I believe, than most of them realize. Those in South Dakota now know their status and what it means.

Good administration is as necessary as a sound conservation program in maintaining confidence of the people.

# County Attorneys in Vital Role

By MATTHIAS A. THORFINNSON

COUNTY attorneys in Minnesota are making a valued contribution to soil conservation. Although most of their service has been in the capacity of legal advisors, many have gone far beyond this role and have even assisted in district organization. Some were actively advocating soil conservation as far back as the days of the CCC.

The Minnesota Soil Conservation Districts Law names the county attorneys as the legal advisors of district governing bodies. One might think this would be viewed hourly as just another additional chore. Most of the county attorneys look on this responsibility, however, as an opportunity to make a real contribution to the conservation of our greatest natural resource—the soil. They have met with the district supervisors at most of their organization meetings and at numerous meetings later to advise on specific problems. They have helped to set up legal forms for district records, advised on insurance needed where districts were operating machinery, and passed on memoranda and contracts before these were entered into by the districts. They have even helped interpret the districts law for individual farmers who were considering becoming district cooperators, a service far beyond the requirements of the law.

Take the instance of Reuben Nelson, county attorney of Wilkin County at Breckenridge, Minn. At one of the meetings of the board of county commissioners, it was decided to visit the East Agassiz Soil Conservation District in Norman, Clay, and Polk Counties to learn more of what a district does and how it operates. The county commissioners, Nelson, the county engineer, and the county agent all made a tour of this district. This was arranged by N. H. Olson, county agent, at the request of the county board and was conducted by Arthur C. Libby, district conservationist. The group came back convinced of the value of a soil conservation district to Wilkin County and immediately set about to organize a district. A county-wide meeting of town board members and all others interested in soil conserva-

tion or drainage was called by the county commissioner at Breckenridge and Nelson took the lead in presenting the proposition to the assembled group, which filled the courthouse to overflowing. At the request of the county commissioners the town boards agreed to be responsible for organization in their townships. Nelson had joint responsibility with the county agent for completion of the job and summarizing of reports. He assisted in the organization of the district governing body, and since that time has been very active in advising them of the legal aspects of the job. He has been instrumental in preparing legal papers concerning grant of access, cooperative agreements, rental agreements, and charge and collection procedures. He has also provided legal assistance in connection with the State laws relating to drainage. He has represented the county and the district in several group enterprise jobs. He has given his time and advice frequently whenever called on, and has provided excellent service in keeping peace and harmony on drainage problems which might not otherwise have been solved by participating farmers and units of Government concerned.

William T. Johnson, Washington County attorney at Stillwater, Minn., has helped soil conservation along in his official capacity and as a citizen. Before becoming county attorney, Johnson assisted in getting a CCC camp into the county to work on soil erosion. As secretary of the St. Croix Soil Conservation Association he wrote several soil conservation articles for newspapers and otherwise publicized the conservation program. He took a hand in launching the Washington County soil conservation district. His predecessor, Milton Lindblom, met with the district governing body and explained its powers and duties. As county attorney, Johnson has met with the supervisors on at least two occasions to discuss the districts law and amendments thereto. He has also interpreted the law for a number of farmers interested in becoming cooperators.

George Tyler, formerly county attorney of Sherburne County, met with the supervisors shortly

NOTE.—The author is extension soil conservationist, University of Minnesota, St. Paul, Minn.

after the district was organized and explained the legal responsibilities of a district.

Walter Johnson, Wright County attorney, met with the supervisors at their organization meeting and discussed some of their main legal responsibilities and powers. He offered to meet with them from time to time to advise on legal questions arising. On the question of possible tax exemption of farm woodlots, for instance, Johnson studied the law and gave the supervisors his interpretation.

In some of the older districts county attorneys have become more active as new problems have emerged.

To get closer cooperation of the Houston County town board, the county commissioners, and the Root River Soil Conservation District, the district supervisors turned to County Attorney L. L. Roerkohl to work out plans with them. It was decided to hold a joint meeting of the township board and the county commissioners, for the purpose of considering the legal aspects of the control of water and debris being sent down every year onto the township and county roads. The purpose was to bring out the legal responsibilities of the farmer, the township and the county board, and to discuss what the Root River Soil Conservation District could do to help solve the problem. Also present were State highway officials, the county engineer, Soil Conservation Service representatives, and the county agent. Practically all of the officials who were invited came to this session.

County Attorney Roerkohl quoted the States laws in regard to control of surface water as related to highways and adjoining farmlands, and cautioned township officers as to their responsibilities and limitations in carrying out control

measures on public rights-of-way. He also advised as to the powers and limitations of each of the other governmental subdivisions.

In all the newer districts, county attorneys have assisted the district governing bodies by interpreting the law, checking memoranda of agreements before adoption by supervisors, and advising them as to supervisors' functions and limitations in soil conservation, drainage and flood control projects. A good example is John Walbran, county attorney of Steele County. Walbran discussed the powers and duties of district supervisors and explained that he could advise on the legal steps in setting up county or judicial ditches, but could not represent the supervisors before the county board or before the court.

Harold A. Flynn, Scott County attorney, and John A. Coughlin, Rice County attorney, have discussed the law with the district governing bodies and have given advice on the legal steps in setting up county or judicial drainage enterprises. Flynn has clarified the procedure involved in setting up mutual drainage groups.

(Continued on page 181)



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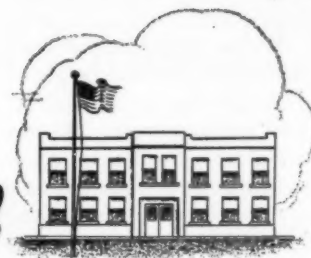
Root River Soil Conservation District studies problems. From the left: L. L. Roerkohl, county attorney; E. A. Albrecht, vice-chairman; Elmer Thies, board member; John R. Wheaton, secretary-treasurer; Joseph Lorenz, board member, and Frank Ormsby, chairman.



(at left)

Conference in Steele County. From the left: Burton Chambers, chairman of board; John Walbran, county attorney; Ben Kajer, secretary; Carl Hintz, board member; Paul Bueckler, vice-chairman; Charles Belina, treasurer, and J. R. Gute, county agent.

# HAWKEYE STATE *School Program*



BY WILLIAM T. MAAKESTAD  
AND MORRIS E. FONDA

**S**CHOOLS of Iowa are preparing youngsters for their responsibility as caretakers of our natural resources. Soil and water are being featured in Iowa's classrooms as the most fundamental of all resources.

Teaching boys and girls the value of soil and water, and something about how to conserve and use them, has not been an overnight accomplishment. For a number of years the science course as outlined for elementary schools has given attention to conservation. With the advent of the soil and water conservation program county school superintendents became interested, and in 1944-45 there were 25 counties where schools were teaching the subject. Interest of faculties increased the following year, and 33 counties included the teaching of conservation. Toward the year's close the State Superintendent of Public Instruction, Miss Jessie Parker, gave new impetus to the program by suggesting that her new rural supervisor, Miss Ivah Green, might help with a coordinated conservation-education project.

Serving to speed the idea along was a four county meeting in east central Iowa last spring for county superintendents, county extension directors and chairmen of the district governing bodies held for the purpose of discussing how to develop a suitable outline for teaching conservation. George Summers, district conservationist, made arrangements for the meeting. Joining in the conference, also, were Misses Green, I. E. King, assistant state conservationist, and the authors of this article. Farm program directors from radio stations at

Cedar Rapids, Marshalltown, and Waterloo took a lively interest in the points at issue, pledged their stations to doing everything possible to help the educational program along.

Conservation education, soil and water conservation teaching and many related aspects were covered. As a first step, it was felt that a uniform outline which all of the four counties could use would be needed. Misses Green, King, Summers, and the assistant extension soil conservationist, were designated as a committee to prepare such an outline.

Told of the proposed plans, the State Superintendent of Public Instruction, suggested, instead, that a uniform outline be developed for all counties of the State. This led to five county superintendents from various parts of the State being added to the committees; all of them had had some experiences in teaching conservation. The first meeting of the group was held early in the summer, at which four objectives were set forth and appropriate action suggested. The objectives—

1. To prepare material which would be part of the regular science course rather than add a new and separate study to an overloaded curriculum.
2. To revise the science course on a 3-year cycle, providing one or more units in conservation each fall, winter, and spring term.
3. Because of immediate need for information on soil conservation, it was decided to prepare five units on this subject which would serve as the science lessons during the fall of 1946.
4. To have the eighth-grade examination questions next spring include questions on conservation topics.

In addition, the committee urged that emphasis be placed on in-service teacher training by means of field tours, workshops, conservation talks, use of visual aids and other devices.

NOTE.—The authors are, respectively, assistant extension soil conservationist in Iowa, and head of the section of education, Soil Conservation Service, Milwaukee, Wis.



In some instances, local groups are sponsoring and actively helping with teacher training. One example, among many, is the assistance given by the Shelby County Bankers Association in cooperation with the soil conservation district. Bankers and district arranged for transportation and lunch for 127 Shelby County teachers visiting the experiment station at Clarinda. Supt. F. E. Brouhard led the teachers, as Dr. G. M. Browning, of the Soil Conservation Service, research staff, and Dr. M. L. Peterson, of the Farm Crops Section, Iowa State College, explained the investigations carried on at the farm.

The Department of Public Instruction is taking the responsibility of leading the program. In the forefront, too, are county superintendents, district governing bodies, the Extension Service, and the Soil Conservation Service, and many local groups. The assistant extension soil conservationist has worked with most of the county superintendents on this program.

Today, the teaching of conservation in the schools of Iowa is a reality. A recent survey shows that 93 of the 99 county superintendents already are using the State outline, with their teachers actually teaching conservation. When 400 rural teachers attending the last State teachers' conference were asked how many were actually teaching conservation, over 90 percent replied in the affirmative.

With the purpose of helping teachers to become better acquainted with conservation, technicians of the Soil Conservation Service and the Extension Service are meeting with a diversity of teachers' groups. So far, 47 counties have received assistance from these 2 agencies at various gather-

ings. In addition, the regional office of the Soil Conservation Service at Milwaukee has furnished teaching aids and materials and has suggested numerous ways to implement conservation into the regular school courses.

An upsurge in the teaching of soil and water conservation is gratifying in itself, but the larger dividends will be the conservation-mindedness of our citizens of tomorrow—the boys and girls who are being developed in the schools of Iowa today.

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The Cottonwood County attorney has helped in similar ways.

Glenn C. Sawyer, Fillmore County attorney, met with the boards of supervisors at their organization meeting and reviewed the State law as it defines their duties and responsibilities. He also has assisted the boards in preparation of newspaper notices for elections, and has advised them on paying insurance for the operation of equipment.

Thomas J. Scanlon, Olmsted County attorney, assisted the boards in obtaining proper insurance when operating a tiling machine, and in preparing the form of receipt used with cooperators from whom they collected money.

Milton I. Holst, Goodhue County attorney, and Arnold W. Hatfield, Wabasha County attorney, met with all district supervisors in their counties to explain the soil conservation district law. They also checked over the district agreement forms.

These are but a few examples of how county attorneys are making themselves helpful to the 31 districts already organized in Minnesota.



Shelby County teachers at the Soil Conservation Experiment Farm near Clarinda, Iowa.

# SOIL CONSERVATION *in Our Democracy*

By H. C. BYRD, President, University of Maryland

**M**Y GRANDFATHER was a sea captain. My first thought about soil conservation came when, strolling along the river shore one day, he pointed out to me where, when he was a boy, his father had anchored his ship. The water was hardly deep enough to push a small flat-bottom skiff. Then he pointed out a place far out in the water where he said a house used to stand, where fig trees had grown in the yard, behind which in the evenings he had spent his time at home hugging a good-looking girl, who later, it happened, became my grandmother.

In a boyish way, I wondered where the land that once had been there had gone, and what had become of the deep water where ships had anchored.

Recently, in driving an automobile across the United States, I saw, along the Mississippi, the Missouri, and the Platte, and in many other places, recent and more serious evidence of the ravages of erosion.

In the light of what modern day science has taught us about values that lie in the soil, it would seem that we can give new meaning to the words of Genesis, which give man his beginning out of the soil. When we consider that our very existence depends upon the minerals that plants draw from the land; when we know that we must give back to the soil those values that are taken from the soil by plants and consumed by us, something of new meaning may be read into the words, "For out of it thou wast taken, and dust thou art and into dust shalt thou return."

**I**T is not my purpose to talk largely about the values in our soil. You, perhaps, know far better than I that soil gives to the plants that grow in it only those food values that the soil itself contains. Nothing could be more wrong than for some of our nutritionists to say, "Drink a pint of milk, eat an egg, eat some fruit, eat some green vegetables and you need never worry about your health." There is no particular apparatus in a cow's biological machinery, for instance, to produce phosphorus and calcium in her milk, unless that phosphorus and calcium was in the hay or pasturage or other feed. Sometimes I think that the butterfat test in milk might well be supplemented with a test as to the amount of calcium and phosphorus milk contains. Copper, iron, cobalt, magnesium, potassium, silver, sulphur, and other minerals that our body requires will come to us through the plants we eat only if they are contained in the soil in which the plants grew. It is difficult even to conjecture the extent to which soil depletion, in other words a lack of soil conservation, has affected the course of history. It would take a tremendous amount of research to determine the numbers of people who have migrated from one part of the earth to

another in search of land rich enough to sustain their lives. We know that nearly 2,000 years ago, under Rome, there were certain sections of what is now Italy in which birth rates declined in the rural districts to such an extent that bounties were offered for every child that was born. It is believed that these birth rates declined largely because of soil depletion, which took from plants the procreative elements which are necessary to propagation of the human species.

The northern shores of the Mediterranean could no longer support their populations satisfactorily after the Romans had denuded the forests; and, to this day, I understand the shore lands of Yugoslavia are almost barren because no system of cultivation has been devised to prevent rains from constantly washing away the top soil. Canaan was no longer a land of milk and honey when the forests were destroyed and the subsequent irrigation systems failed.

It was not without basic reason that Cicero uttered his famous, "Carthage delenda est." Carthage then was the center of the richest wheat growing section in the world. Roman soils had been depleted and Carthage was the granary that furnished Rome and Southern Europe with its bread. And recently, in all probability, this was the chief reason why Italian and German eyes were cast in that direction. The top soil of Tunisia was the objective

NOTE.—Dr. Byrd delivered this address at the First Annual Meeting of The Soil Conservation Society of America, December 12, 1946.

in the last war just as much as it was when Rome and Carthage fought; and, while in this world of problems and difficulties it is not safe to make many predictions, I would not hesitate to indicate that Great Britain, in one way or another, will retain her present hold on that same territory and for the same reason. Who holds the lands of Tunisia will come close to feeding the hungry mouths of Europe. Not only are the lands of Tunisia a source of power, but they are also a source of profit.

**A**s god commanded in Genesis, the earth brought forth "grass—the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself," causing plants thus to perpetuate themselves; but these plants will not bring forth any more in the way of food values, so far as minerals are concerned, than the soil itself contains.

In our diets we may get the fats and all that is necessary to make us seem to be in good health, but if we accept the thesis that plants, because they are of a certain variety, contain all that is necessary of certain food values, which actually they do not contain because these values were not in the soil in which the plants grew, we are probably missing some of the elements, the absence of which creates diseases and destroys health.

It is impossible for us to say definitely that the great percentage of rejections due to physical inability in the second World War, as compared to the first, were due to depletion of food elements in our soils, but it would be extremely difficult to find any other reason that would be responsible for such a Nation-wide and general condition.

It is not necessary to talk about soil depletion in relation to our farm income. We know that a rich and fertile soil means an income for our farm people which will raise their standard of living and which will create a buying power in agriculture which is the basis of our national economy. It is true that when agriculture is prosperous, the nation is prosperous; because agriculture furnishes such a large percentage of the basic raw materials on which our industries depend. Fertile soil means prosperous farms and prosperous farms mean a prosperous and sound nation. And, to carry this a little further, it is likely that a prosperous nation means a sound government.

**B**UT, say some, the conditions on the farms and the matter of depletion and loss of soil is something for the farmer to worry about and not for the cities. Well, Dr. Hugh Bennett not long ago made a speech before the Kiwanis Club of Baltimore in which he produced facts and figures which indicate the extent to which the cities, particularly our seaports, are, or should be, interested in soil conservation. Dr. Bennett astonished Baltimoreans by some of the figures that he used to show Baltimore's financial interest in this work. In the small Baltimore harbor alone, the channels have been kept open only at a cost of \$17,000,000 spent by the Federal Government, in addition to the millions that have been spent by private concerns and by the city itself. Probably 20,000,000 cubic yards of sediment have been removed from the Baltimore harbor, and this sediment was largely top soil that came from Maryland farms. In other words, Maryland farms

thus lose their productivity, and to remove this silt from the harbor costs millions of the taxpayer's money.

The natural question that arose in the minds of those Baltimore businessmen of the Kiwanis Club was, "Why is not it a profitable thing to teach Maryland farmers to practice conservation on Maryland farms to prevent this waste of Maryland's topsoil, and by so doing, preserve the economic worth of Maryland's farms and, in addition, prevent such large expenditures of money for dredging?" The same question and the same condition would be applicable to many other States and many other cities of America; in fact, to practically all of them.

It does not take any great mathematician to figure that with profits at one end, and savings at the other, the soil conservation program would pay for itself and be profitable to everybody.

**T**HE welfare of every individual will in the future depend upon the productivity of the soil. We have been a profligate nation. We have depleted our natural mineral resources to such an extent that the end of most of them is in sight. Much of what we have in mineral resources we have been, and still are, giving away. All that we shall have left is our land. That land must furnish to us the food which means existence and health. It must furnish to us the fibers, the other varied products of one kind or another, out of which we shall manufacture our plastics, our clothing, and perhaps our medicines. Yes, man is so basically tied to the land, the state of our nation is so much dependent on the soil, that it seems to me the greatest basic problem we face is to tie society to the land, to make



Dr. H. C. Byrd, president of the University of Maryland.



our citizenship fully conscious of the real meaning of the words, "From dust thou art."

What are we doing about it, and what can be done? Well, we are doing a good deal: We can, and must, do more. In fact, we have got to do a good deal more.

We do not want, some day, archeological researchers, digging into the rubble of one of our ruined and long forgotten cities, to ponder over the results of the ignorance of a people who neglected their basic resource.

When the State programs of soil conservation were first undertaken, I believe that the Soil Conservation bill, written largely in the U. S. Department of Agriculture and introduced in the Maryland legislature in 1937, was one of the first in the country. I shall never forget the words of my friend, O. C. Bruce, who came to me and said, "This bill has been introduced, but it will only go through if you take hold and guide it." Well, I thought at the time that any bill on soil conservation ought to have easy sailing. However, toward the end of the session, the Chairman of the Finance Committee of the Senate sent for me and, taking this bill out of his desk, said, "Curley, what kind of a thing is this anyway? Is this yours? Why, it sets up local governments within the county governments and extends powers beyond anything that the State ever has extended to groups of people in this State. I think we ought to kill it." My reply to him was this, "Would you deny the right of our people in different sections of the State to organize themselves into groups for their own betterment, with the main objective of protecting the basic economic resource of the State? If so, you deny to them the very elements of democratic procedure."

The bill passed, and shortly after the session, went to the Governor for his signature. The lawyers advising the Governor indicated to him that the bill was too far-reaching and should be vetoed. Our people interested in soil conservation asked for a hearing. At the hearing, the lawyers who were present advised the Governor strongly against signing the bill, their reason being that it was too far-reaching in its provisions, that it set up governments within governments, etc. The Governor then turned to me and said bluntly, "What do you know about this and what do you want to say about it?" Laughingly, I said, "Well, Governor, I don't wonder that the lawyers are opposed to this and say it should not be signed, because about all that most of these lawyers know about our economic life is to try to keep some of us out of jail when we go wrong, and they don't always succeed in doing that." Then, seriously, I said, "It is useless to try to go into all the merits of this bill this afternoon. There isn't time. But every law is just as good as its administration and I pledge you that if you sign this bill you will be doing the biggest single thing that any man has ever done for agriculture in Maryland, and I will pledge you that it shall be administered in such a way as to be a credit to you and to your administration." The Governor signed the bill and it became the soil conservation law of Maryland. Today the districts organized under that law cover almost the entire State. There is no other work in the State which has occasioned so much generally favorable comment. Soil conservation in Maryland has come to stay. We are on our way to great and abiding developments in the protection of our land, to the ultimate profit of our entire citizenship.

So apparent is the need for soil conservation that I wonder that all our people do not "get up on their hind legs," to use a colloquial Eastern Shore of Maryland expression, and demand that depletion of our lands cease and that methods be employed everywhere to preserve the fertility of the land. If our nation's prosperity, and consequently sound Government, depend on the land, you may be certain that, if our soil resources be depleted to a point where they are unable to support our people in health and prosperity, the end of democracy in America will be at hand. If we are going to save our democracy, if we are going to preserve the integrity of our representative kind of government, it must be done by conserving our basic resource, the soil. The welfare of our people, the stability of our government, and the conservation of our soil, are so irrevocably bound together that if the base of the structure, the soil, fails, the whole structure will fall.

It is not far fetched to consider that we shall have more people than our land can feed. I am told that the awful poverty of Japan and China today rests upon this factor. Recently, I had a letter from my daughter in which was the following sentence: "Until the ship docked at Japan and put garbage cans over the side and I saw hundreds of people literally fight to get at those garbage cans for food, I never knew what poverty meant."

China, I understand, has starving millions, entirely because a small proportion of its lands are under cultivation. Japan reached out for more land in order to feed its millions. Japan was thwarted, but it is inevitable that its millions must be fed, because when people are starving, they will do anything for food.

We do not want depleted lands in this nation to develop such a condition here, and we want our government to continue in its present form. No nation, no people, ever flourished since the beginning of recorded history after food and vital necessities began to disappear. Then it is that those who control foodstuffs and distribution become rulers. If that time comes, our people will no longer be free. Russia calls it communism, Italy called it fascism Germany called it nazism. We may call it regimentation. But whatever it may be, if that condition comes to pass, it will not be democracy as we understand it.

You agree with me, I know, that we do not want our soil resources to vanish, whether it be through overcultivation, through failure to return to the soil minerals which plants take from the soil, or whether it be through soil erosion, or any other reason. We cannot countenance depletion of our soil unless, at the same time, we countenance the destruction of those factors that are basic in our national life. We cannot maintain our high living standards if our productive lands are allowed to disappear, while, at the same time, our people become more numerous.

We are making, through public health measures and medical research, every possible effort to advance the length of our lives. I doubt if our democratic government would tolerate measures to decrease or limit population. The only sure way to safeguard our situation as a people and as a nation is to safeguard our soil.

The Soil Conservation Society of America is a new organization, but, no organization ever started in a field in which the possibilities of achievement were greater. I



I believe that we are laying the right foundation for an enduring and vital program, but the task has hardly begun. Ahead lies a job of such magnitude that it is difficult even for us to grasp and particularly will it be hard for those who know little of the tie between the soil and the national economy.

A member of our Board of Regents, once, in questioning the type of work that was being carried on, and in questioning me on the effectiveness of the work, took me to a farm on which various kinds of soil conservation demonstrations were being conducted. He said, "So much money has been spent here that it is more than the whole farm is worth," which was true, in all probability; but what that member of our Board failed to grasp was the effect of that demonstration when it began to be translated to actual practice on many, many farms. And so you, in carrying the gospel of soil protection into your communities, and into various parts of this country, will find many "Doubting Thomases." Let me entreat you, though, to carry that gospel just the same and let that gospel carry, as a basic fact, the word that problems of the land do not stop at farm, county or State borders, and that soil depletion, from erosion or from any other cause, affects us all, regardless of faith, race, creed, or political affiliations, irrespective of whether we be bankers, business men, professional men, or farmers.

**I**N THE BEGINNING, many of us were slow to accept wholeheartedly a few fundamental truths. We did not learn easily the lesson that education alone would never get done the job of soil conservation. We had to learn that money must be spent for a demonstration program that would point the way. We had to find out for ourselves that isolated action in scattered areas could not be substituted for cooperative community action, if a community, state, and national problem were to be solved.

But through these tribulations, through the processes of learning by experience, in my opinion at least, soil conservation has at last found a permanent place in our community and national life. And in finding this permanent place, through the rigors of tough experience, the beginning of soil conservation work has produced the finest basic example of democratic action in the agricultural history of this nation, namely, an effective, coordinated, program through the organization of soil conservation districts.

Having been instrumental in getting the Maryland legislature to pass, and the Maryland governor to sign, our soil conservation bill, which became the conservation law of Maryland, I should like to talk with you a few minutes about how these districts have fitted soil conservation into our representative, or democratic, form of government.

As a starting point, we knew that if soil were to be conserved, the farms and the farm owners of America would have to be the basic instruments to be used for that purpose. In addition to this, we knew that, under our way of living, any effort to force farmers into soil conservation practice would be a violation of our democratic principles, and would be certain to fail. No farmer can be commanded or forced into anything. His native and sound intelligence, though, make him quick to discern

intelligent and sound leadership. It was evident that if soil conservation efforts were to succeed under such premises, that it must be on a purely voluntary basis. A voluntary act meant cooperation under local government; that is, under local organization created by the people.

On such democratic principles was evolved, through the organization of the Soil Conservation District, the most far-reaching program that has ever taken place in our democracy; and the program is growing with remarkable rapidity. I know of nothing else in our agricultural history quite like it.

**T**HE soil conservation district is getting the job done in a thoroughly democratic way. Perhaps the most important reason is that the governing bodies of the districts, usually farmers themselves, coordinate the activities of local, State, and Federal agencies, which cooperate, into a completely integrated program that eliminates duplication and overlapping. That function of coordination represents, to me, one of the truly great aspects of the soil conservation districts program. It has brought about a spirit of cooperation among organizations and agencies that in many instances had existed previously only on paper.

Let me carry that thought a little further. A soil conservation district comes into being only at the will of the people of a community. The first job is to prepare two highly important documents—a program, which spells out the job that *needs* to be done, and a work plan, which outlines *how* the job will be done. The latter plan—how the job is to be carried out—is where the coordinating function of the district begins, for it specifically names groups, organizations, and agencies, and the assistance each has agreed to provide.

Think about the significance of this kind of cooperation. Here is a group, duly organized by a democratic process under a State law, which says, in effect: "Here is the job; here is what the Extension Service, the Soil Conservation Service, the Farm Bureau, the Grange, the county commissioners, the State Forestry Department, the schools, the civic clubs, the highway department, the garden clubs, the sportsmen's clubs—and so on—are going to do to help us get the job done.

Such action represents democracy in fullest flower. It represents a spirit of cooperation that has evolved through common interest in the soil.

We must not permit ourselves to be satisfied with the progress soil conservation has made. True, we have come a long way, but the major part of the tremendous task lies ahead. We must think about ways and means of doing the job faster and better.

**E**DUATION in soil conservation can be the biggest help, or lack of it, the worst barricade, on the road to complete understanding and adoption of methods to save our land. Let's admit that a big job has been done in conservation education, or else the tens of thousands of farmer-cooperators in the more than 1,700 soil conservation districts would never have become interested. In all of the States, however, there are other tens of thousands still to be convinced that they need soil conservation on their farms.

The educational job in districts already formed, and in communities where districts should be organized, is primarily the task of the Extension Services of our Land Grant Universities. In many communities these hard-pressed and earnest men and women of the Extension Service have recognized the soil conservation district for what it is—a mechanism to get concerted action to conserve our basic resource—and have spared no effort to help organize districts and help them operate successfully. In other areas, we must admit, the job has not been done so well.

In general, though, our agricultural educators have done their jobs successfully. But we must intensify and speed up our educational processes so that conservation can be put into effect more rapidly and in broader areas. We are moving fast, but not fast enough. I believe education is the principal bottleneck. In that connection, I commend to you a splendid address on the need for conservation education by Dr. R. K. Bliss on the occasion of his retirement after many years of distinguished service as Extension Director at the Iowa State College. Dr. Bliss, may his tribe increase—understands the problem of conservation education as few people do. I am pleased to see his name on the program of this conference.

Now may I say a word about what the States can do to help soil conservation in our democracy. I believe it is a State responsibility to provide financial aid. As I see it, the State legislatures can best contribute by providing funds for sorely needed heavy equipment, for the payment of necessary expenses of district governing bodies, for the printing of educational literature and the procurement of motion pictures and other educational materials the districts need. The State governments, I believe, should also give a clear mandate to all their agencies and departments to cooperate fully with the soil conservation districts.

I would like to see intensified activity on the part of the 48 State soil conservation committees, commissions, or boards that are set up under the various State laws. Here are groups that can provide greater guidance to district governing bodies, help them recognize and assume their responsibilities, serve as a medium for the exchange of information and methods, and be their articulate spokesmen on legislation and other matters. At this point, let me observe that it is well that governing bodies of districts are forming State-wide associations, and that the State associations are coming together in a national organization. This, I think, is a fine thing for action under a democratic government. In unity there is strength and progress. Incidentally, what could be more inspiring than the selfless leadership of the more than 8,000 district supervisors or directors who labor at great personal sacrifice that their neighbors, their community, their State, and their Nation may benefit?

The Farm Bureau and the Grange in our State are wholeheartedly behind soil conservation work because their membership is made up of the people who know what is being done, and why. Recently, a local Grange presented the following statement at the meeting of the National Grange:

"Soil conservation programs already have yielded returns far above the expenditures made for soil building practices, developing sound conservation methods, and establishing soil conservation districts. They should now be extended further to broad natural areas where it is beneficial to do so. As further progress is made with soil conservation as a national policy, the programs in their broadest application should tend to become self-sustaining."

Besides this, the Maryland State Grange passed the following resolution:

"Having supported the inauguration of soil conservation work in the State and the passage of the Soil Districts Law in 1937, the State Grange wishes to commend our State authorities and the University of Maryland, in cooperation with the U. S. Soil Conservation Service, for the splendid progress being made. We wish to commend the Board of Regents of the University and the Governor of the State for the increase in support of this work by the last State budget and urge that increased funds be made available in the future to assist the Soil Conservation Districts in the promotion of this important work. We also urge our representatives in Congress to provide adequately for the U. S. Soil Conservation Service and maintain its identity in the U. S. Department of Agriculture."

The State Farm Bureau also passed a similar resolution.

Big soil conservation rallies also have been held in the State, at which the work has been highly commended and plans made for future developments. Maryland is heart and soul with the soil conservation program, because through its democratic procedures the people of the State know and understand what it means.

Now I come to my final major observation concerning the acceleration of our program. Let me say first, and frankly, that we must have a continuing aggressive national agency devoted exclusively to the problems of land conservation. We have that now in the Soil Conservation Service. The job is too vital, too complex, and too basic ever to become a sideline to another activity. We cannot permit the national job to be split into segments, or to be subordinated to a variety of other agricultural programs. Ever so often you hear rumblings from Washington that the Soil Conservation Service will be made a part of the Extension Service of the Land Grant Colleges. Or you hear that it will be put under the Production and Marketing Administration, or that it will be a part of the AAA or that some other administrative disposition will be made of it. Let us remember that the Soil Conservation Service is basic to our national welfare, is necessary to the social life of our people, and, consequently, is sufficiently important not to become a subsidiary part of any other service.

If work experience means anything, I can say to you that, in my opinion we have done a better job in Maryland than we would have done had the Soil Conservation Service been a part of our Extension Service; and I am certain that we have done a better job than we would if the Soil Conservation Service had been a part of the AAA or a part of any other unit of the Federal Department of Agriculture.

Personally and officially I find myself in a harmony with that great American whose booming voice for 30

years has preached the doctrine of soil conservation. The vision of this prophetic leader has culminated in a vigorous organization which has approached its tremendous task as few Government agencies have ever done—in a thoroughly democratic way through the local communities. I refer, of course, to Hugh Hammond Bennett. To Hugh Bennett our democracy owes a great debt—one that posterity will appreciate more fully than we. Hugh Bennett had a vision. The result of that vision will be more far-reaching than any of us here today could possibly conceive. A half century from now, this man's name will be written in history as one who foresaw the greatest need of his country and as one who had the courage to initiate the action which met that need.

**N**o more cooperative agency of the Government ever existed than the Soil Conservation Service. Its research is coordinated with the States. Its technical assistance, without which we would have no national soil conservation program, is given exclusively through locally organized, locally controlled soil conservation districts—and then only at the invitation of the leaders of those districts. Yes, the contribution of the Soil Conservation Service has been magnificent. Soil conservation in our democracy cannot continue without such technical help, which no other agency is equipped to provide.

But may I again emphasize that we are moving fast but not fast enough. As with better conservation educa-

tion, with increased State appropriations and participation, with more activity on the part of the State soil conservation committees, so, too, do we need to accelerate technical assistance to the farms in districts. We need to devise better techniques, faster procedures, but we must not sacrifice quality. The science of soil conservation is not a formula program that can be applied indiscriminately to all farmlands; it is based on the concept that every acre has a proper use and must be treated according to its needs and capacity for production.

It has been a signal honor to speak to you at this first annual meeting of a new society dedicated to the advancement of the science of soil and water conservation. I am appreciative of the opportunity to convey to you my thought that our free society could not survive the loss of its basic, irreplaceable resource—the soil. After many years of trial and error, we have laid a firm foundation for a national program. Let us now build upon that foundation. Soil conservation in our democracy is an infant in swaddling clothes. Through cooperative, progressive, dynamic, methods, we must nourish that infant into a hardy, mature citizen for the everlasting benefit of posterity.

Let our vision never be clouded by inconsequential or extraneous issues. Let us have the courage that is the need of every great enterprise. Let us work under the ever present stimulus that we are safeguarding the future of our children and building security for America.

## Districts Provide a Pattern of Thinking

By Ayers Brinser

**I** CANNOT ESCAPE the conviction that the lasting importance of soil conservation districts to Massachusetts farmers is not the yards of stone wall pushed into a ditch nor the acres contoured, but the way they can clarify and expand the whole pattern of our thinking about land use. An idea of this sort can be much more concrete than any amount of loose talk about bulldozers and early cut hay. The fact is that timid though we may be about ideas, it is ideas that govern what we do, the way we do it and, most important, why we do it.

You might say that the soil conservation district is a kind of lens which brings all parts of the picture into a clear focus. Farm programs in the past were specific and technical. They had little

to do with the idea of farming. They were primarily concerned with better crops, better herds, and higher prices. Each in itself was extremely important to the farmer but they were not necessarily related. Soil conservation districts are based on the idea that successful farming and successful farmers are dependent on a balanced and carefully integrated program for the whole farm. They emphasize the relationship of the programs.

The first practical application of the ideas of the soil conservation district is the farm plan. The farm plan is no more than an estimate of the land resources available to each of us on the farms we occupy. It shows us what these resources are and how they may be used so that they will produce to their fullest capacity. It is the blueprint on which we can build future production.

It is perfectly true that soil conservation districts do not automatically create perfection. It cannot be repeated too often that the soil conservation district is an opportunity to do a job for ourselves. It is a cooperative effort in which we are the most important cooperators. It is up to us as farmers to see that soil conservation districts really do the job for which they are designed. A district is not a gift on a platter. It is a plan of work in which each of us must do our full share.

NOTE.—This is a condensation of an address given during Farm and Home Week at Massachusetts State College. Mr. Brinser is a Supervisor of the Northwestern Worcester County Soil Conservation District.



It requires understanding, patience and, above all, participation.

I should say that conservation implies wise and permanent use by human beings. Therefore, we can broaden our concept of soil conservation districts to include not only preserving the soil but fitting it for the widest possible use. By use, I do not mean exploitation by one generation but permanent use for as long as men depend on the land for life, and that promises to be a long time.

I believe that grass is the most important single natural resource in New England. By raising better hay, better pastures, better poultry ranges, we can reduce our dependence on imported grains. If you agree with me that grain shortages are not temporary but are rather the result of the growing livestock industry in the grain-producing west, then I think you can see how important better grass is to New England. The soil conservation district, by making possible the better use of our land, increases our supply of forage. In other words, it gives us the opportunity to do more farming. After all, the basis of agriculture is land use. Good land use means getting the most value out of the land on a permanent basis. There is no short-term value in agriculture.

It will be very difficult to justify, under any sound land use program, our acres of pasture full of hard hack and our hay fields of June grass and white horse. Better grass means cheaper milk and cheaper eggs. By keeping up our volume and reducing the cost, we are fulfilling our job as farmers. We are giving more people the food they need at a price they can pay. For the orchardist and the market gardener, the soil conservation district, with its possibilities of contouring and drainage, offers the same hope of more for less.

I do not think that we should expect to justify higher prices for New England milk, eggs, fruit, and vegetables than those of products of similar quality shipped in from other areas. Any artificial means to maintain a false price will be bound to fail. If a Wisconsin farmer, raising his own grain, can deliver milk in Boston for less than our cost of production, our job is not to devise some subterfuge to keep that Wisconsin milk out of New England, but rather to find the way to make our milk cheaper than his. I think those ways can be found through the full utilization of the soil conservation district program.

What is projected here is not a temporary solution to a temporary shortage but rather a long-

term program to meet the continuing problems of New England agriculture. I believe that with a sound program of land use, making soils more productive, adapting fields to machine culture, and improving the quality of our herds and flocks, we shall be able to compete successfully with any other area in the United States. Furthermore, I think the basis of that competition will be on the very sound foundation of more abundant food at lower cost.

In our so-called industrial society where there is so much emphasis on machinery, cost of production and man hours, there is one very important point we are apt to overlook. The great contribution of the machine is time. It does not create anything. If a machine will make as many safety pins in an hour as a thousand men will make in the same amount of time, all that machine has supplied is a thousand man-hours. As long as no one has lived those hours, the work man-hours is a meaningless statistic. Machines simply give us more time in which to live in a way we may prefer. As a nation we have become so devoted to the machine that we assume that life begins with the internal combustion engine. As a farmer, I feel confident that compared with the cow a carburator is neolithic.

Agriculture creates the basis of life. A man who raises an acre of corn is, by his labor, making life possible. In other words, the farmer works with the processes of living. In doing that he is unique among all other people who work in our civilization. It seems to me that one of the chief reasons people elect to be farmers is that their greatest satisfaction comes from playing a large part in the creation of life.

All forms of life live together in a balanced association. As an example of this, some years ago some very kind-hearted people became very agitated by the number of elk slaughtered by mountain lions in the Kaibab National Forest. A noted hunter was dispatched to the area. He succeeded in polishing off practically all of the lions. The result was that the elk multiplied so rapidly that forage in the forest was depleted and thousands of elk died of hunger. This is an extremely simple application of the problems of balance in nature. The intricate relationships of living things extends all the way from human beings to the fungi and micro-organisms in the soil. We have all observed how legumes will grow in one kind of soil and not on another.

(Continued on page 191)



# Lovegrass



By CLARENCE BUNCH

On Wadley's farm the lovegrass provides excellent grazing, hay, and additional income from seed. In the background, just under "Windy West," topsoil can be seen blowing from a neighbor's field not under soil-holding cover.



**H**ENRY WADLEY, Negro farmer of Geary, Okla., planted weeping lovegrass on his hands and knees with a pepper shaker in a prepared plot 128 feet long and 36 feet wide. Wadley knew that people would think him crazy if they saw him going through such queer maneuvers; so he prepared the experimental plot where he thought he would be concealed from view by trees and shrubs. But he was seen anyway, and word got around. There were those who did wonder if Wadley might not be a little "touched."

Wadley laughs about it now. That little plot of weeping lovegrass showed him how he could save his farm from wind erosion. He planted it with a handful of seed received from the Soil Conservation Service. That was 3 years ago, shortly after he had become a cooperator with the Central North Canadian Soil Conservation District. Like many another farmer of the area, Wadley had been losing topsoil through wind erosion. When exposed, the light, sandy soil of this part of Oklahoma is peeled off and blown away by the wind that comes with certainty every spring and occasionally at other times. Productivity of the farm had declined to a low level, but a coordinated soil conservation program now has brought his land back to a paying basis in three years.

In addition to tying his land down with weeping lovegrass, Wadley uses crop and pasture

rotations, grows soil-improving crops, and strip crops. He planted a windbreak. To round out his coordinated program, Wadley still has a few moves to make, one of which is to provide water facilities for his cattle.

But it's the weeping lovegrass about which Wadley most likes to talk.

"That little plot of land that I planted with a pepper shaker put me in the lovegrass business and I'm in it to stay," he says, "That's the only thing to stop the blowing of soil around here. It's a hardy plant, this lovegrass, good for our sandy soil, able to get along in hot or cold weather. It stops erosion.

"Lovegrass makes good grazing, cattle like it. In the fall and winter my cattle walk over wheat to graze the lovegrass. It's the first grass out in the spring—it gets green in February—and it stays green even through hot, dry summers. If snow doesn't cover the ground, I can pasture it all the year around. Of course I have to give my cattle some supplemental feed in the winter, usually a pound of cotton meal cake per head daily for 3 months, November to February."

When Wadley saw what the weeping lovegrass did in his little plot, he paid \$90 for a small sack of seed (the price has ranged from \$5 to \$8 a pound). When told what the sack cost, his wife exclaimed: "My land, what's in there, gold?"

"I told her it was as good as gold," Wadley answered.

Wadley planted one-third pound of seed per

NOTE.—The author is soil conservationist and work unit leader, Soil Conservation Service, Geary, Okla.

acre. He now has 45 acres in weeping lovegrass. The past summer he had a herd of 30 head of Hereford cattle, a herd built up from 1 cow bought when he married in 1928. He now has his own registered bull. In midsummer he marketed 10 calves at an average price of \$87 each.

About the first of August, last year, Wadley put his 30 head of cattle in a 30-acre field of weeping lovegrass. If snow does not bury the field, the cattle will be kept on this pasture through the winter, he said. The cattle graze the lovegrass until noon each day, then go a mile for water, remain in the shade near the water and graze a nearby 16-acre field of sudan grass in the afternoon.

In 1946 Wadley harvested seed from that first little plot of weeping lovegrass for the first time. He got 28 pounds. He harvested 252 pounds of clean seed from 16 acres of a 30-acre field of weeping lovegrass, although he could not get a combine in time for the best yield, and he had 2 tons of hay after threshing the seed.

Wadley planted his larger field of lovegrass with a drill owned by the Central North Canadian Soil Conservation District. He declared that he could not get along without assistance from the district.

Wadley and his neighbors planted approximately 50 acres in lovegrass last fall, but the best planting time for weeping lovegrass in this area is from April 10 to May 10. In about 6 weeks the lovegrass will be up enough to protect the soil against wind erosion. Until it gets this high the lovegrass itself must be protected against the wind. Shallow listing is one way to do this. When the grass comes up, weeds must be controlled and grazing should be held off until the second year of growth. The small amount of labor involved will be well repaid, for weeping lovegrass, in a coordinated soil conservation program, not only holds the soil against blowing, but provides excellent pasture and hay, conditions the soil with a deep-root system, and serves as a cash crop through the sale of seed.

Wadley was born on the farm which he is now restoring to productivity through a coordinated soil conservation program. His father homesteaded the farm and enlarged it through purchase.

"In the beginning my father used to get 35 bushels of wheat to the acre and 50 bushels of



Henry Wadley, conservation leader in his community. He makes effective use of weeping-lovegrass on his farm near Geary, Okla.

corn," Wadley said. "Wind and some water erosion gradually cut that down. When I became a district cooperator 3 years ago, wheat and corn production was down to 7 or 8 bushels an acre. The farm was scarcely paying its way. Father didn't know what was happening or what to do about it. But I do, thanks to my soil conservation program. I have two boys coming along and I'm going to leave them a farm they can be proud of."

Wadley has a diversified farm of 320 acres. Besides his cattle, he has corn, sorghum, cotton, peas, a woodland, pigs, and chickens. The sale of eggs and cream brings in a steady weekly income. The woodland provides fence posts and fuel. Other crops augment the cash income from his basic beef cattle enterprise. His farming methods have won the interest and respect of his community. The Agricultural Improvement Association honored him by electing him president. This association is an organization of Negro farmers living around Endora who are all wrapped up in the new farming ideas which hold so much hope for agriculture in the windy West.

# REVIEWS

**INDUSTRIAL AND COMMERCIAL GEOGRAPHY. BY J. RUSSELL SMITH AND M. OGDEN PHILLIPS. HENRY HOLT AND COMPANY, NEW YORK, 1946. 957 PP.**

This is a book about the materials of industry and commerce. Like "North America" by the same authors, it contains amazing detail put together with outstanding skill. Unusual comments about familiar things keep interest alive. The side remarks add zest to a presentation that might easily have been a mere recital of facts.

The authors remind us that the pivotal point of geography is place. They are concerned about where industrial and commercial activity occurs, where it thrives, where it languishes, and why. Our environment changes, because we deplete some of our resources and learn how to use others in different ways. As the environment changes, the wants, abilities and habits of the people must change too.

About three-fourths of the book is given over to descriptions of the great industries and economic activities. Two chapters discuss the significance of inanimate energy and the fundamentals of manufacture. As long as men and beasts were the main sources of energy, most of the people in the world had to work at food production. Mechanical power eased the problems of survival and made industries possible. Chapters 4 to 22 take up the raw materials of industry—coal and petroleum, metals, non-metallic minerals, forests, farm products, rubber, fisheries, and the others. The discussion of agricultural products is prefaced by a chapter on the Place and Nature of Agriculture.

These chapters tell the sources, significance and uses of each commodity. Here in the chapters on agriculture, for example, are the dot maps showing where in the United States each crop is grown. Some of the captions under pictures or maps are designed to stimulate curiosity. For example: "In explaining this map of density of cattle and calves per square mile, you have a good chance to test your knowledge of agricultural geography."

Chapters 23 to 36 are about trade. First, "why do we trade," which is because of differences in peoples, differences in the stage of industrial development, and differences in resources. Trade routes and trade centers develop as people seek to exchange the goods that they have for something they want. The trade routes of each continent and of the oceans are discussed. Airways are not neglected. After consideration of technical skill and financial power, the authors conclude that "Airways on and between the Eurasian and North American Continents will carry the bulk of all air traffic in the future." They point out that on the vital routes, the United States does not have airfields and must petition other Nations for landing rights.

The authors have purposely used statistical data from the prewar rather than from the war period. They say, "Politics and wars may change the man-made arrangements like a kaleidoscope, but man must continue to use material resources as best he can. \* \* \*

The final chapter presents some interpretations of trends in man's affairs. Some resources will be used up. Land will wear out if it is not treated properly. Technology will make better use of power. Increased power may be used for good or for evil. The authors ask, "Is not the real need a careful reappraisal of our spiritual resources and their importance?"

The authors give some significant facts about produc-

tion of food on rough lands, directly and also indirectly through animal products. Crop-yielding trees such as the pecan, hickory, walnut, persimmon, mulberry, sugar maple, and especially the oaks, may be made to yield many times more food for man or beast than they do now. Selected oak trees in some places will yield more edible carbohydrates per acre than corn on similar land; and acorn bread is palatable. This idea is developed with all the enthusiasm we would expect from the author of "Tree Crops." Possibilities of growing more and better grasses and legumes on our nonplowable pastures do not get quite so much attention. The geography of pastures and range lands is one of the few topics that this reviewer would like to see covered more fully.

Dr. Smith and Dr. Phillips are soil conservationists. They speak with conviction about the impending doom of soil destruction. "The United States Soil Conservation Service has published a terrifying map" (the soil erosion map). They think that this map has significance like that of the handwriting of Belshazzar's wall. So far, thanks to technology, the "fitness of lands to support us is rapidly increasing in spite of the present destruction—often reckless and useless destruction—of resources." They know—and cite crop yields in Belgium as an example—that there are both possibilities and limitations in obtaining better yields through fertilizers and improved farm practices. Pictures in the book show a number of good conservation-farming practices. There are some erosion pictures, too.

The authors have little patience with the system of distribution that lets surpluses accumulate while the land runs down, people go hungry, and the farmer takes the principal production risks. Their comments on this system are stimulating.

The book is remarkably illustrated. There are 50 tables, and hundreds of photographs, charts, and maps. Those of us who remember geography as a dull list of countries, capitals, and principal products in the seventh grade now find that this kind of geography is different. Here are some facts about the things in the world, and an interesting exposition of how the need or the desire for things makes a lot of people behave the way they do.—J. GORDON STEELE.

## LOVEGRASS

(Continued from page 188)

The solution we may think is a matter of a simple commercial fertilizer. Actually the processes involved in establishing a soil suitable for legumes is an extremely intricate one of creating in the soil harmonious communities of a vast array of bacteriological and animal life. The soil conservation district is in a broad sense an effort to maintain this kind of balance of living forms on the farm, adjusting cows, trees, grass, hens, micro-organisms and men to a harmonious community.

Along with this biological climate of harmonious relationship, there is also in a nation so complex as ours a political climate. In the United States, we use the term "democracy" to describe a balanced and harmonious political structure. It is one political system in which individuals live together, not on one another. Perhaps one of the great contributions of the soil conservation district is the application of democratic principles to land use.



# REFERENCES

COMPILED BY WILLIAM L. ROBEY

SCS personnel should submit requests on Form SCS-37 in accordance with the instructions on the reverse side of the form. Others should address the office of issue.

## SOIL CONSERVATION SERVICE

Earthworms as a Factor in the Formation of Water-Stable Soil Aggregates. By Henry Hopp and Homer T. Hopkins. Reprinted from *Journal of Soil and Water Conservation*, Vol. 1, Nos. 1 and 2.

Erosion Control on Watershed Lands. By Carl Brown. Reprinted from *Journal American Water Works Association*, Vol. 38, No. 10, October 1946.

## OFFICE OF INFORMATION

### UNITED STATES DEPARTMENT OF AGRICULTURE

A Pasture Handbook. Miscellaneous Publication No. 194. United States Department of Agriculture, Washington 25, D. C. Bureau of Animal Industry, Bureau of Plant Industry, and Bureau of Dairy Industry. Issued April 1934, slightly revised September 1946. 15¢.<sup>1</sup>

Consumption and Trends in the Use of Fertilizer in the Year Ended June 30, 1944. Circular No. 756. United States Department of Agriculture. Division of Soils, Fertilizers, and Irrigation, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration. November 1946. 10¢.<sup>1</sup>

Crotalaria Culture and Utilization. Farmers' Bulletin No. 1880. United States Department of Agriculture, Washington, D. C. Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration. October 1946. 10¢.<sup>1</sup>

Fire Fighting on Farms. Miscellaneous Publication No. 612. United States Department of Agriculture, Washington, D. C. Divisions of Agricultural Engineering, Bureau of Plant Industry, Soils and Agricultural Research Administration, in cooperation with the Extension Service. October 1946. 15¢.<sup>1</sup>

Growth and Rubber Accumulation in Guayule as Conditioned by Soil Salinity and Irrigation Regime. Technical Bulletin No. 925. United States Department of Agriculture, Washington, D. C. U. S. Regional Salinity Laboratory, Division of Soils, Fertilizers, and Irrigation, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration. November 1946. 10¢.<sup>1</sup>

Ladino White Clover for the Northeastern States. Farmers' Bulletin No. 1910. United States Department of Agriculture. Division of Forage Crops and Diseases, Bureau of Plant Industry. 1946. 5¢.<sup>1</sup>

Report of the Chief of the Bureau of Dairy Industry, Agricultural Research Administration, 1946. United States Department of Agriculture, Washington, D. C. September 1, 1946.

Report of the Chief of the Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, 1946. United States Department of Agriculture, Washington, D. C. September 15, 1946.

<sup>1</sup> From the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Report of the Director of Personnel, 1946. United States Department of Agriculture, Office of the Director of Personnel. June 30, 1946.

Report of the Librarian, 1946. United States Department of Agriculture Library, Washington, D. C. September 15, 1946.

The One-Two-Three! to Better Yields and Profits. PA-21. United States Department of Agriculture, Production and Marketing Administration, Washington, D. C. September 1946.

## STATE BULLETINS

Annual Soil Building Crops for the Blacklands of North-central Texas. Progress Report 1009, Texas Agricultural Experiment Station, College Station, Texas. 1946.

Chemical Composition of Hay and Forage Crops as Affected by Various Soil Treatments. Experiment Station Bulletin 518. Illinois Agricultural Experiment Station, Urbana, Ill. 1946.

Current Farm Economics, Oklahoma, The Agricultural Outlook for 1947. Vol. 19, No. 5. Division of Agriculture, Oklahoma A. and M. College, Stillwater, Okla. October, 1946.

Dry Land Pasture Experiments at the Central Montana Branch Station, Moccasin, Mont. Experiment Station Bulletin 431. Montana Agricultural Experiment Station, Bozeman, Mont. 1945.

Economic Information for New Mexico Farmers and Ranchers. New Mexico College of Agriculture and Mechanic Arts, Extension Service, State College, New Mexico. December 21, 1946.

Effects of Soil, Soil Treatment, Seasonal Variation, and Variety on Yield and Composition of Corn Crops Grown on Kentucky Soil Fertility Plots. Bulletin 485. Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, Ky. May 1946.

Forty-seven Years of Experimental Work with Grasses and Legumes in Alaska. Alaska Agricultural Experiment Station Bulletin 12. Alabama Agricultural Experiment Station, Auburn, Ala.

Hairy Indigo, a Legume for Florida. Press Bulletin 624. Florida Agricultural Experiment Station, Gainesville, Fla. 1946.

Kudzu. By Julius M. Elrod. Press Bulletin No. 575. Georgia Agricultural Experiment Station, Experiment, Ga. November 6, 1946.

Physical and Chemical Studies of Soils in North Central Ohio Vineyards. Bulletin 663. Ohio Agricultural Experiment Station, Wooster, Ohio. August 1946.

Science for the Farmer. Supplement No. 1 to Bulletin 480, the Fifty-ninth Annual Report, The Pennsylvania State College, School of Agriculture, Agricultural Experiment Station, State College, Pa. September 1946.

Thirty-seven Years of Windbreak Planting at Akron, Colo. Experiment Station Bulletin 492. Colorado Agricultural Experiment Station, Fort Collins, Colo. 1946.

Timber Marketing in Eastern Ohio. Bulletin 666. Ohio Agricultural Experiment Station, Wooster, Ohio. October 1946.

Weed Investigations. Experiment Station Bulletin 402. Louisiana Agricultural Experiment Station, University Station, Baton Rouge, La. 1946.

Winter Oats as Grazing for Beef Cattle. Press Bulletin 627. University of Florida Agricultural Experiment Station, Gainesville, Fla. October 1946.